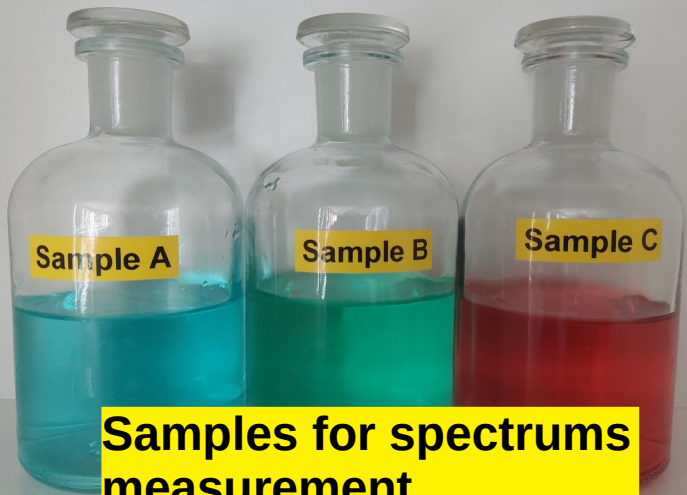




# Spectrophotometry

**Sample preparation.**



**Samples for spectrums measurement.**

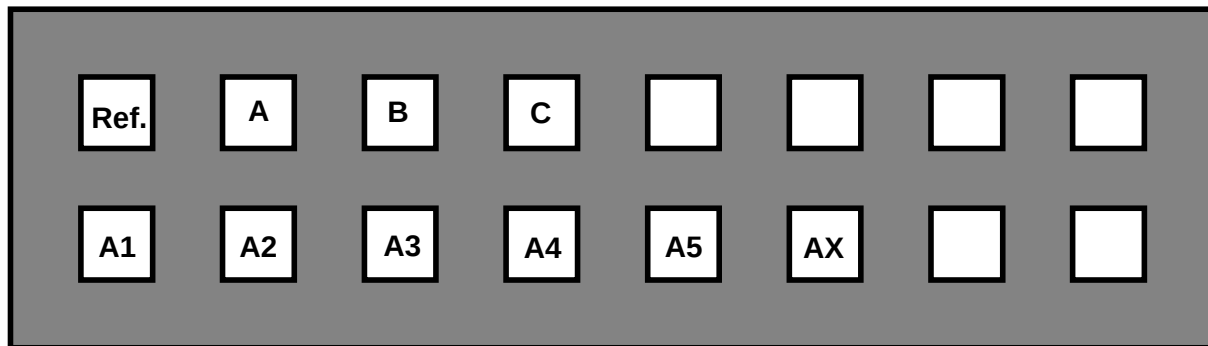


**Samples for concentration determination.**

**Prepare a cuvette rack with sample before starting the measurement.**

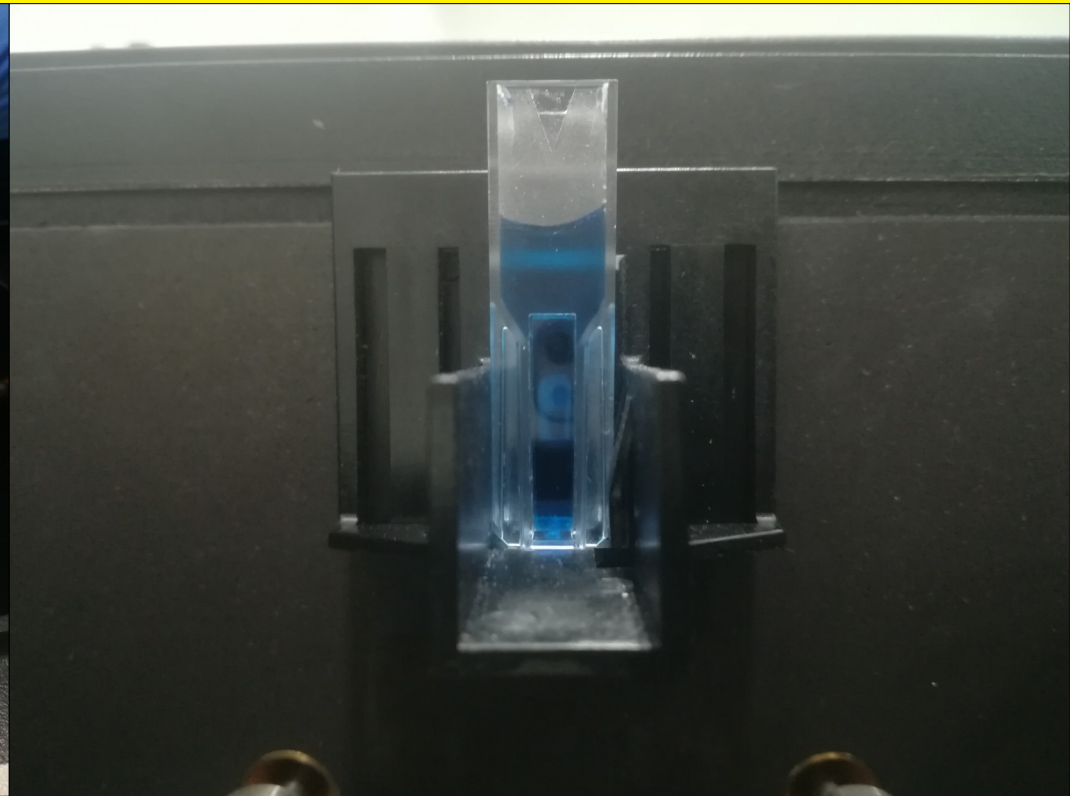
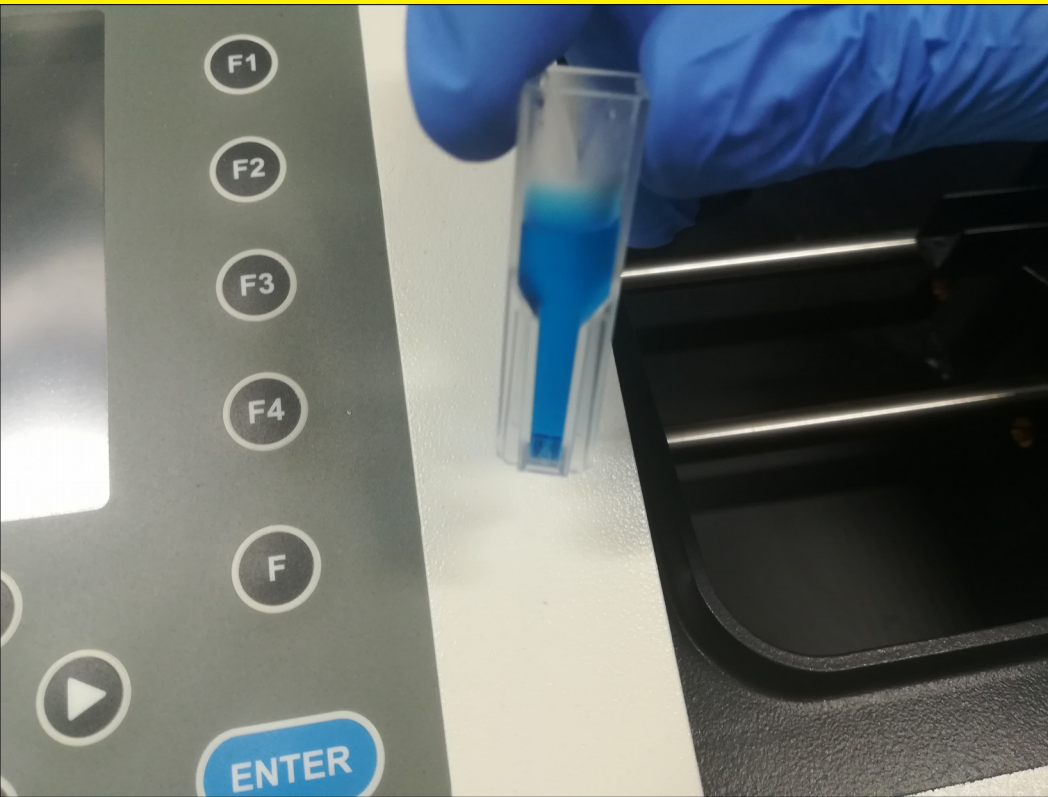
**Use distilled water as a reference sample.**

**Rinse the individual cuvettes after all measurements have been completed.**



# Inserting the cuvette into the spectrophotometer.

Insert the cuvette as close to the wall of the holder as possible so that the light beam passes through the wider part of the narrowed bottom of the cuvette.



**Spectrophotometer initialization.**



Recycle Bin



Acrobat  
Reader DC



picture1



Záloha



Praktika\_CZ



Practicals\_EN



Google  
Chrome



WinASPECT

Location: WinASPECT (C:\Program Files (x86)\WinASPECT)



OBS Studio



GIMP 2.10.20



Microsoft  
Edge



LibreOffice  
6.4



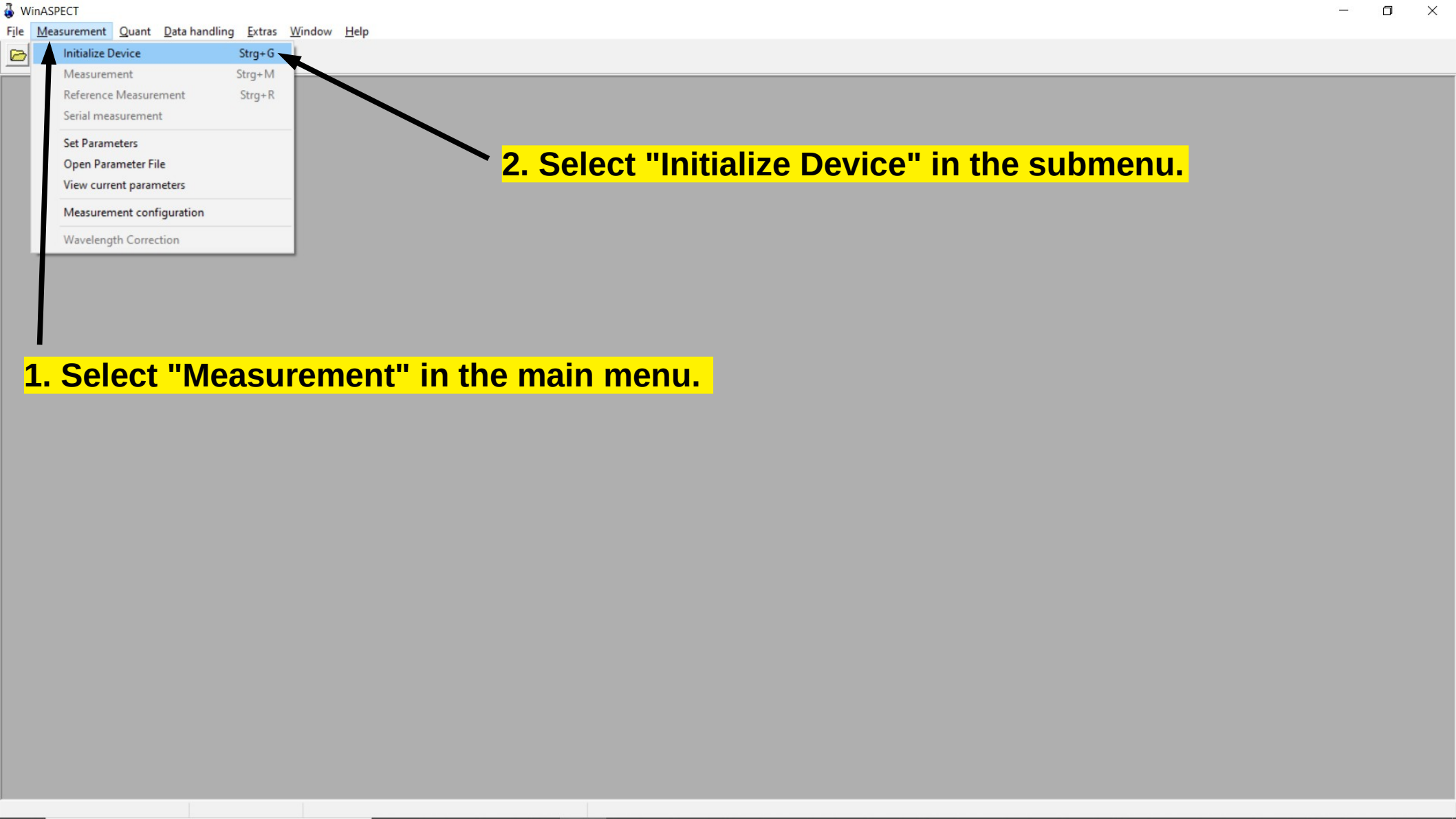
Firefox

**Turn on the SPECORD 40 and wait 2 minutes to startup the device.**

**Click on the WinASPECT icon after starting the device.**

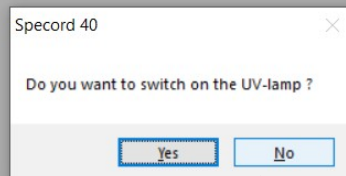
# FUJITSU

shaping tomorrow with you



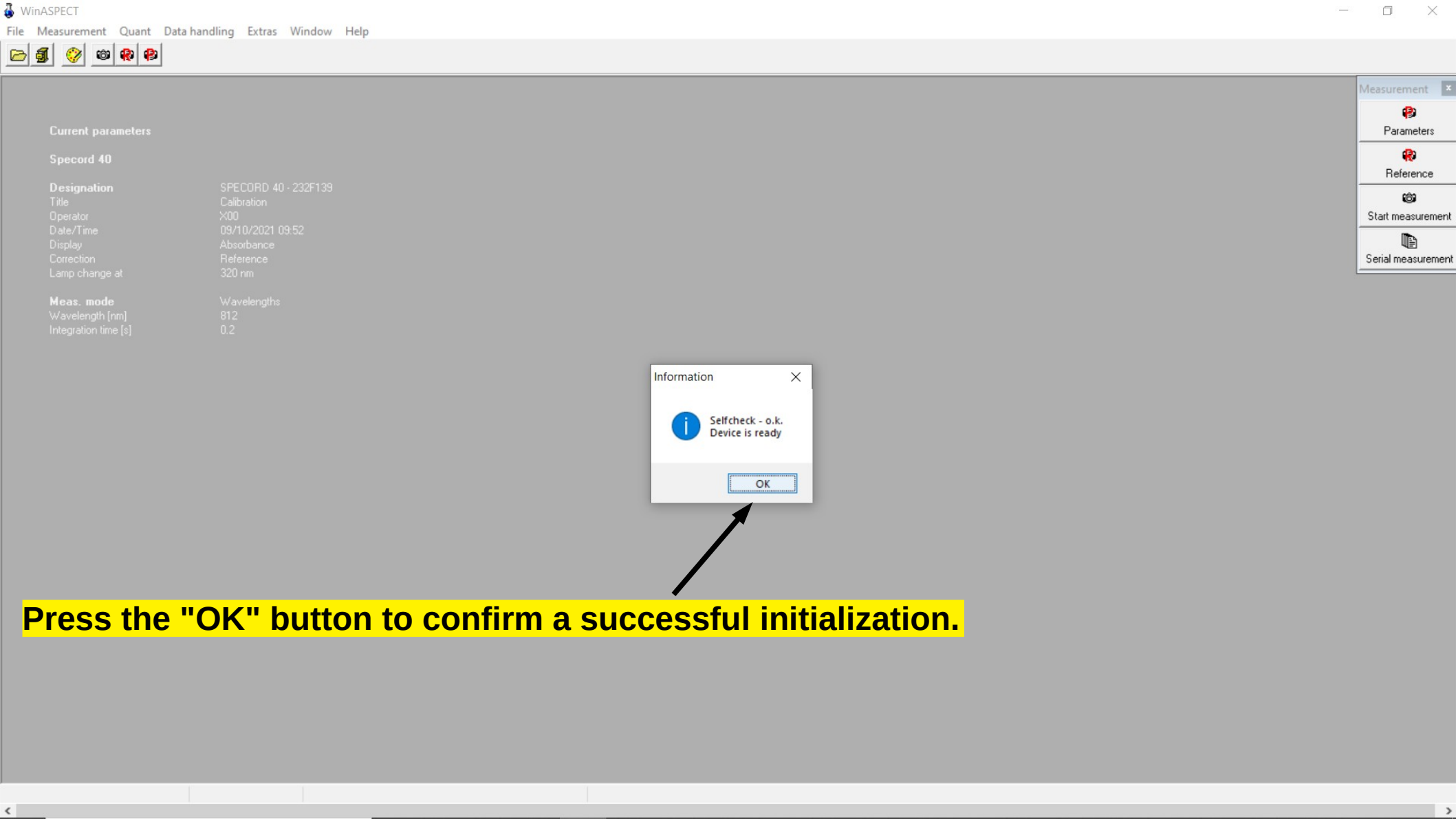
1. Select "Measurement" in the main menu.

2. Select "Initialize Device" in the submenu.



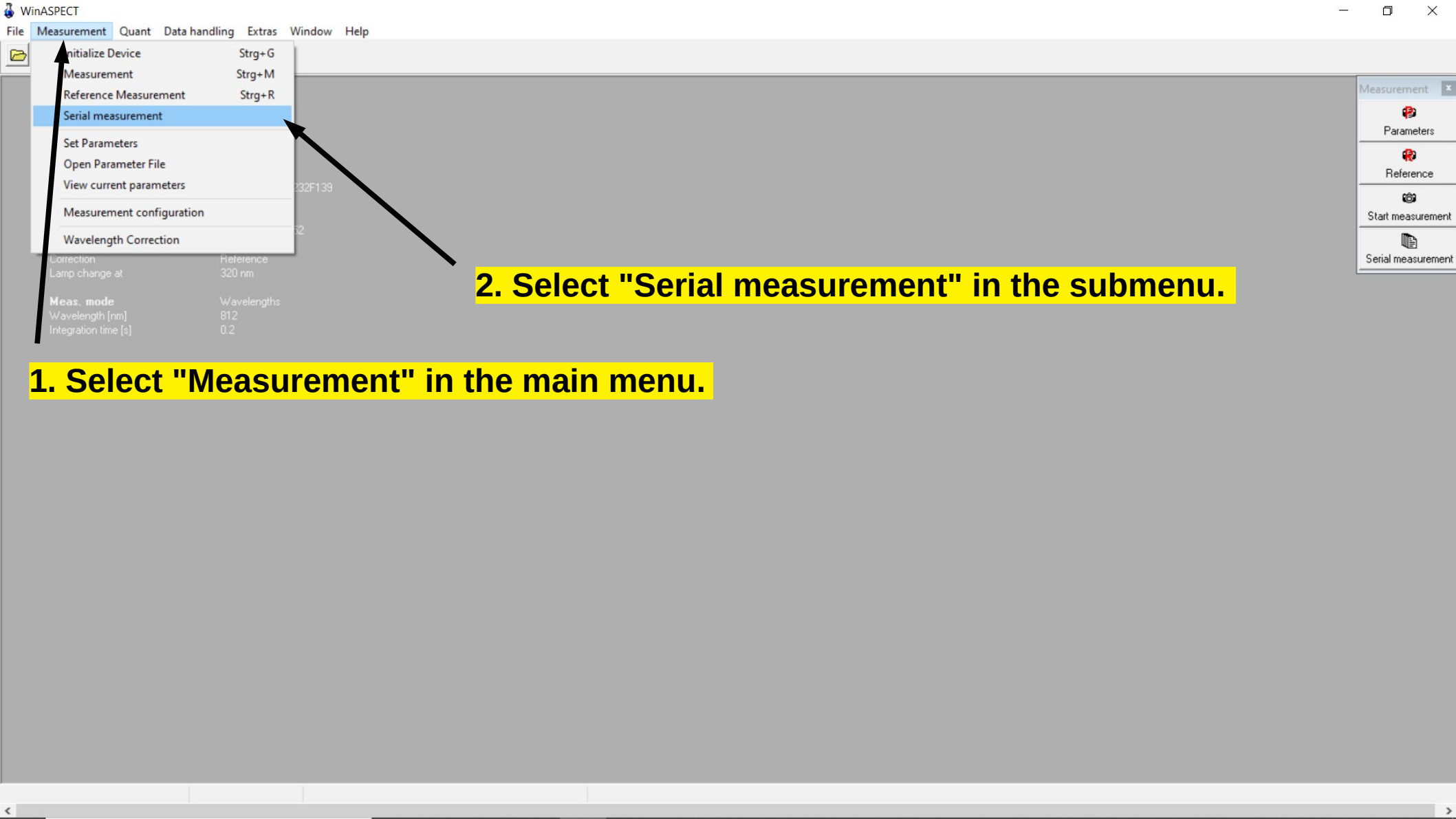
**Press the "No" button to switch off the UV lamp.**





Press the "OK" button to confirm a successful initialization.

**Measurement of absorbance  
spectrums of samples A, B and C.**

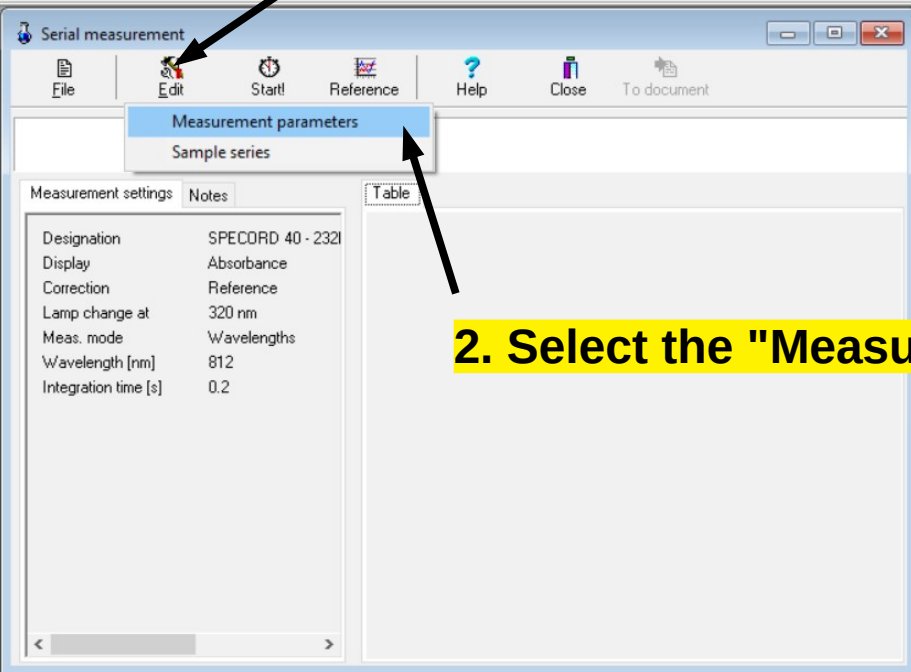


1. Select "Measurement" in the main menu.

2. Select "Serial measurement" in the submenu.



1. Click on the "Edit" icon in the "Serial measurement" subwindow.



2. Select the "Measurement parameters" item from the icon menu.



Serial measurement

File Edit Start! Reference Help Close To document

Measurement settings Notes

Designation SPECORD 40 - 2321  
Display Absorbance  
Correction Reference  
Lamp change at 320 nm  
Meas. mode Wavelengths  
Wavelength [nm] 812  
Integration time [s] 0.2

Table

Click on the "New" icon in the "Specord 40" subwindow.

Specord 40 - C:\Users\Specord40\Documents\Praktika\_CZ\Kantori\X00\_C.par

OK Cancel New Open Save Save as... Help Print

Settings Device Mode Accessories

Title Calibration

Operator X00

**Cycle Mode**

☒ None  
☐ Manual  
☐ Automatic  
☐ Time controlled

Number 3  
Interval time [s] 1

**Display**

☐ Transmittance  
☒ Absorbance  
☐ Energy  
☐ Reflectance

Min: 0  
Max: 3

**Correction**

☐ No  
☐ Standard  
☒ Reference  
☐ Special

Open

saved New

WinASPECT

File Measurement Quant Data handling Extras Window Help

Serial measurement

File Edit Start! Reference Help Close To document

Measurement settings Notes Table

Designation: SPECORD 40 - 2321  
Display: Absorbance  
Correction: Reference  
Lamp change at: 320 nm  
Meas. mode: Wavelengths  
Wavelength [nm]: 812  
Integration time [s]: 0.2

Specord 40 - untitled.par

Settings Device Mode Accessories

Title: Spectrums

Operator: 00X

Cycle Mode:  
☒ None  
☐ Manual  
☐ Automatic  
☐ Time controlled  
Number: 3  
Interval time [s]: 1

Display:  
☐ Transmittance  
☒ Absorbance  
☐ Energy  
☐ Reflectance  
Min: 0.0  
Max: 3.0

Correction:  
☐ No  
☐ Standard  
☒ Reference  
☐ Special  
Open

not saved

Select the "Settings" tab in the "Specord 40" subwindow and set the corresponding values.

**Title: Spectrums**

**Operator: Team name**

**Cycle Node: None**

**Display: Absorbance**

**Correction: Reference**



Measurement settings Notes Table

Designation	SPECORD 40 - 2321
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Wavelengths
Wavelength [nm]	812
Integration time [s]	0.2

In the next step, select the “Mode” tab in the “Specord 40” subwindow and set the corresponding values.

Specord 40 - untitled.par

OK Cancel New Open Save Save as... Help Print

Settings Device **Mode** Accessories

Meas. mode Scan Mode

**Scan Mode**

Range [nm] 375 - 1100

Delta lambda [nm] 1,0

Speed [nm/s] 50,0

Integration time [s] 0.02

not saved

Meas. mode: *Scan Mode*

Range [nm]: *375 -1100*

Delta lambda [nm]: *1.0*

Speed [nm/s]: *50.0*



Serial measurement

File Edit Start! Reference Help Close To document

Measurement settings Notes Table

Designation	SPECORD 40 - 2321
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Wavelengths
Wavelength [nm]	812
Integration time [s]	0.2

Click on the "Save as ..." icon.

Specord 40 - untitled.par

OK Cancel New Open Save Save as... Help Print

Settings Device Mode Accessories

Meas. mode Scan Mode

**Scan Mode**

Range [nm] 375 - 1100

Delta lambda [nm] 1,0

Speed [nm/s] 50,0

Integration time [s] 0.02

not saved Save as...



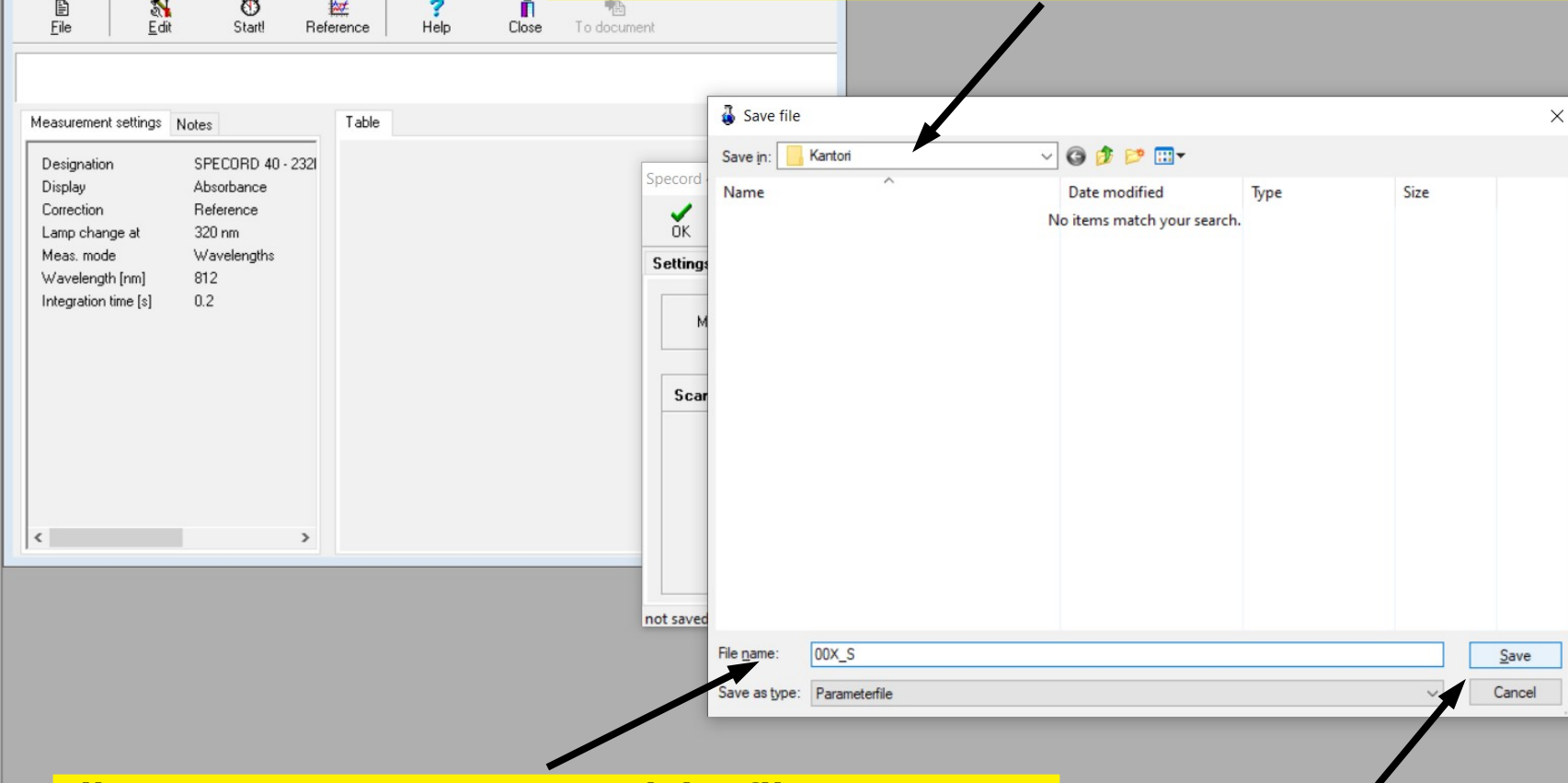
WinASPECT

File Measurement Quant Data handling Extras Window Help

Serial measurement

File Edit Start! Reference Help Close To document

**Save the file in the directory Documents\Practicals\_EN\GroupXX, where XX is the group number.**



**File name: Team name + \_S (The file name consists of the team name and the \_S suffix)**

**Finally, press the "Save" button.**



Serial measurement

File Edit Start! Reference Help Close To document

Measurement settings Notes Table

Designation	SPECORD 40 - 2321
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Wavelengths
Wavelength [nm]	812
Integration time [s]	0.2

Click on the "OK" icon.

Specord 40 - 2321 (Users\Specord40\Documents\Praktika\_CZ\Kantori\00X\_S.par)

OK Cancel New Open Save Save as... Help Print

Settings Device Mode Accessories

Meas. mode Scan Mode

**Scan Mode**

Range [nm] 375 - 1100

Delta lambda [nm] 1,0

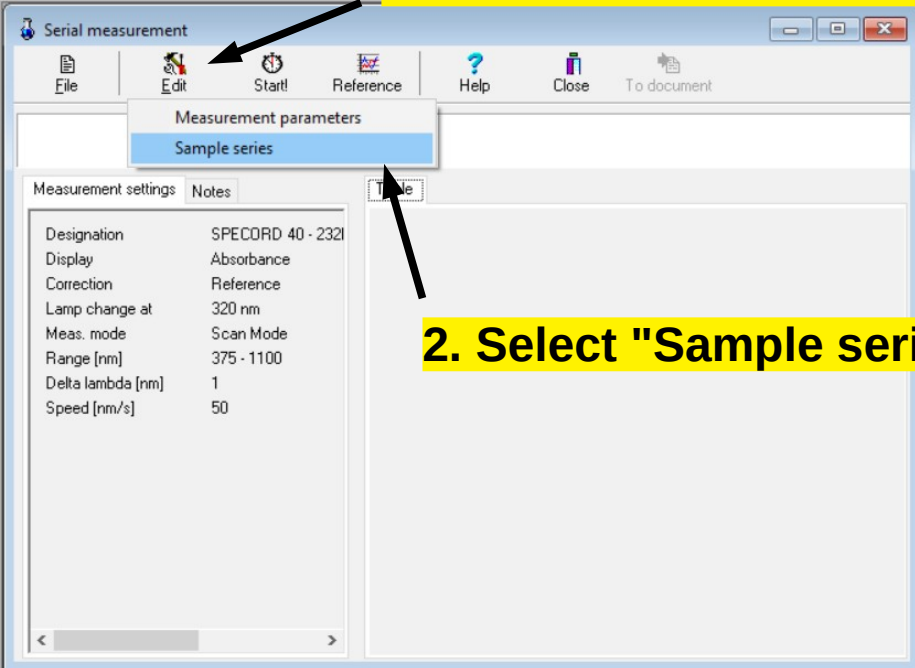
Speed [nm/s] 50,0

Integration time [s] 0.02

saved OK



**1. Click on the "Edit" icon.**



**2. Select "Sample series" from the icon menu.**



Measurement settings	Notes
Designation	SPECORD 40 - 2321
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Scan Mode
Range [nm]	375 - 1100
Delta lambda [nm]	1
Speed [nm/s]	50

Table

Select the "General" tab in the "Serial measurement" subwindow and set the corresponding values.

Serial measurement

General Samples Extras

Description  
Spectrums A, B and C

Operator  
00X

Notes

OK Cancel

Description: *Spectrums A, B and C*

Operator: *Identification of your team*



Serial measurement

File Edit Start! Reference Help Close To document

Measurement settings Notes Table

Designation	SPECORD 40 - 2321
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Scan Mode
Range [nm]	375 - 1100
Delta lambda [nm]	1
Speed [nm/s]	50

1. In the next step, select the "Samples" tab in the "Serial measurement" subwindow.

2. Set "Number of measurements" to 3.

Serial measurement

General Samples Extras

Number of measurements 3

☐ Automatic sample names  
☒ Table of sample names

Import

1.	Sample 1
2.	Sample 2
3.	Sample 3

OK Cancel

3. Select the "Table of sample names" radio button.

4. Fill in the sample names corresponding to the sample bottle labels.

5. Finally, press the "OK" button and the "Serial measurement" subwindow will close.



Serial measurement

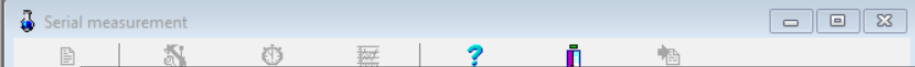
File Edit Start! Reference Help Close To document

Spectrums A, B and C  
00X

Measurement settings Notes

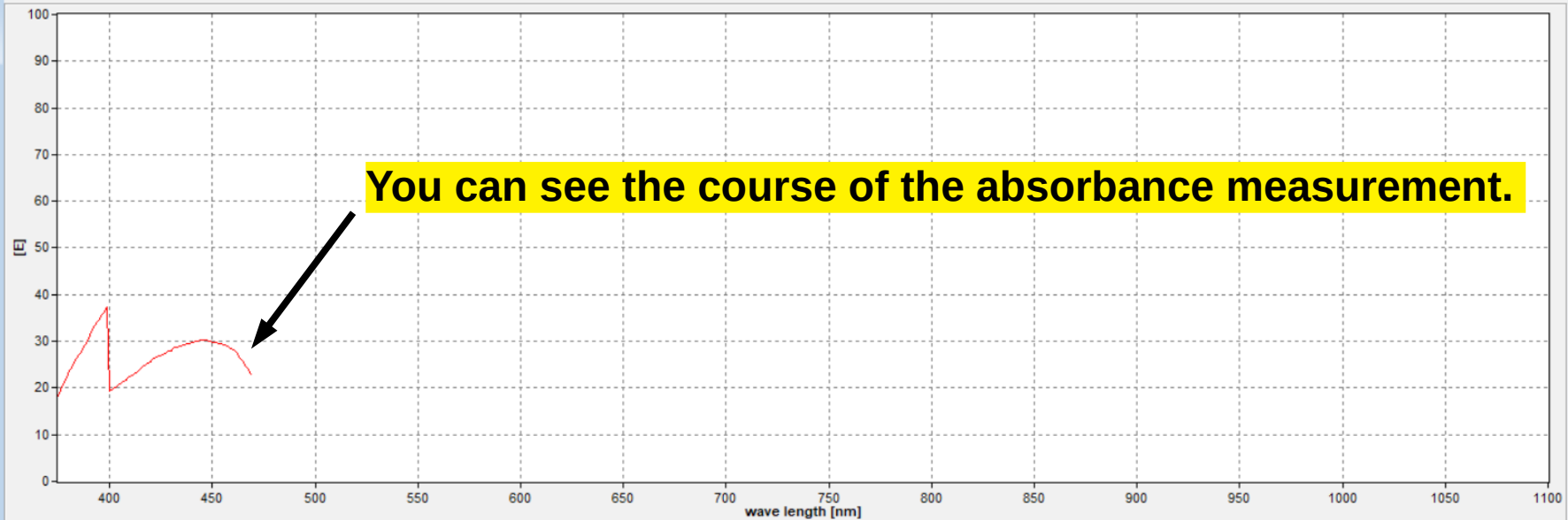
Table	
Designation	SPECORD 40 - 2321
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Scan Mode
Range [nm]	375 - 1100
Delta lambda [nm]	1
Speed [nm/s]	50

**Include the reference sample and click on the "Reference" icon.**



Reference Measurement

STOP! Display



469.00 nm 22.63



Click on the "Start" icon.

Serial measurement

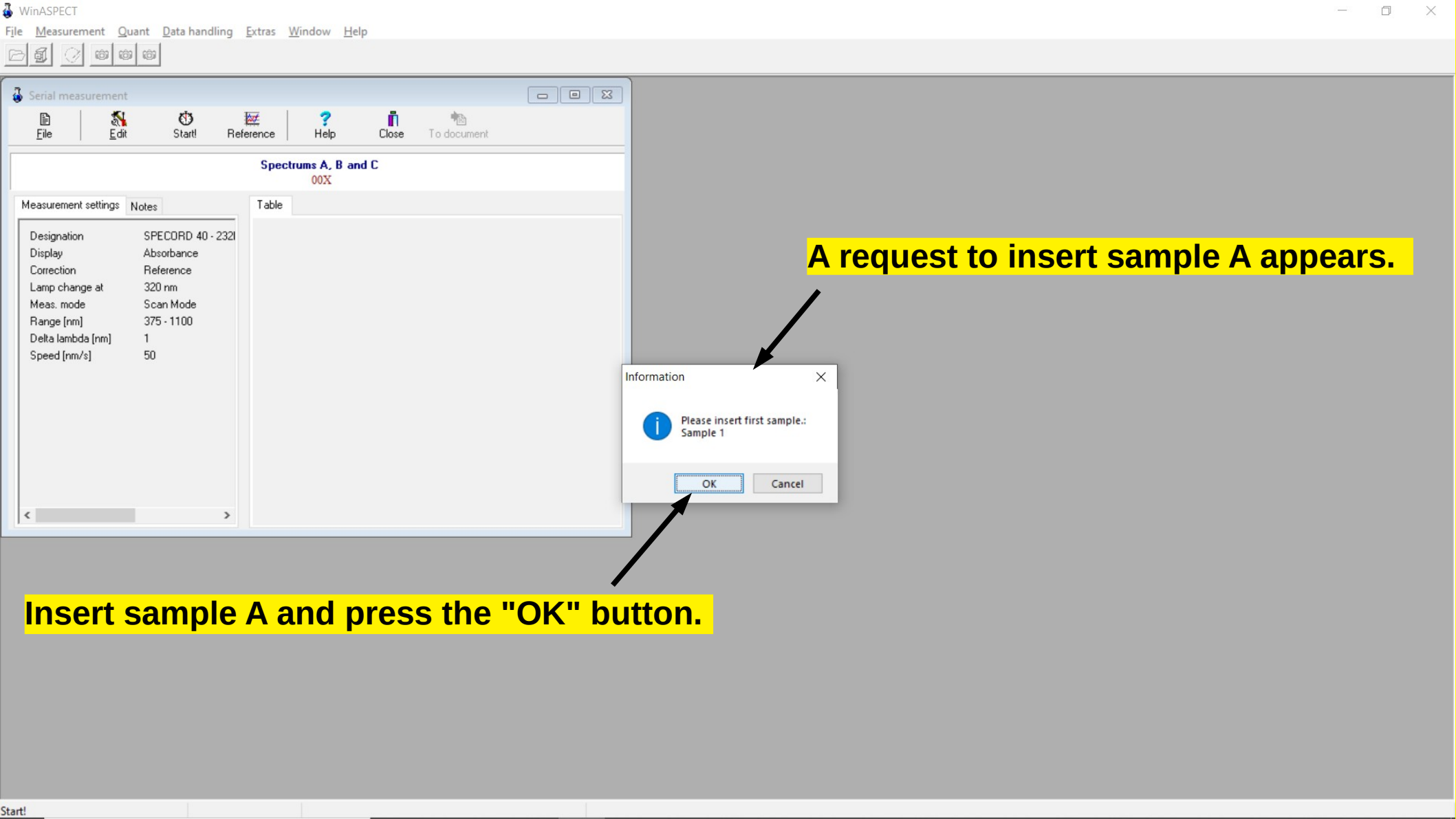
File Edit **Start!** Reference Help Close To document

Spectrums A, B and C  
00X

Measurement settings Notes Table

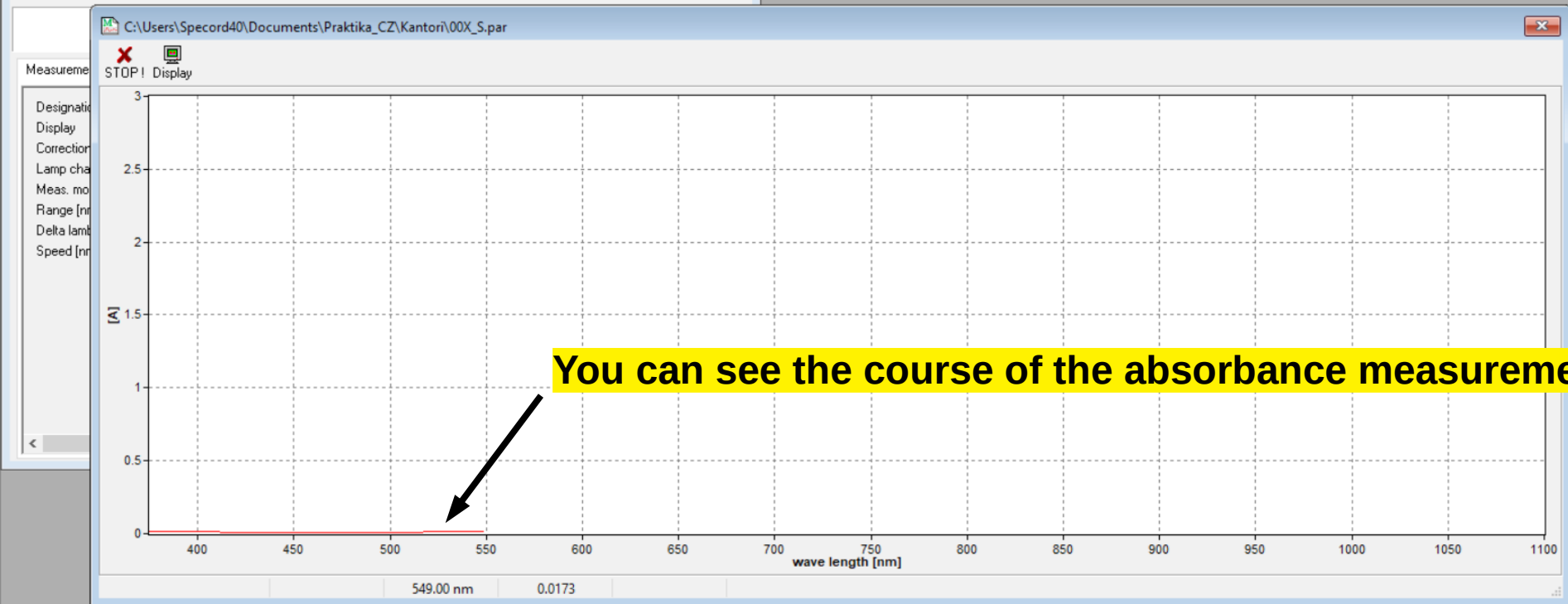
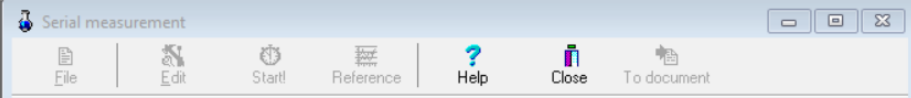
Designation	SPECORD 40 - 2321
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Scan Mode
Range [nm]	375 - 1100
Delta lambda [nm]	1
Speed [nm/s]	50





A request to insert sample A appears.

Insert sample A and press the "OK" button.





Serial measurement

File Edit Start! Reference Help Close To document

Spectrums A, B and C  
00X

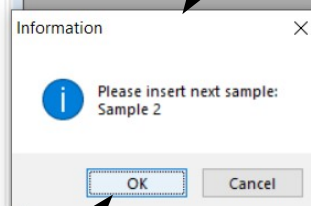
Measurement settings Notes

Designation SPECORD 40 - 2321  
Display Absorbance  
Correction Reference  
Lamp change at 320 nm  
Meas. mode Scan Mode  
Range [nm] 375 - 1100  
Delta lambda [nm] 1  
Speed [nm/s] 50

Table Grafic

		375.0 nm	376.0 nm	377.0 nm	
1	Sample 1	0.0126	0.0129	0.0130	0

A request to insert sample B appears.



Insert sample B and press the "OK" button.



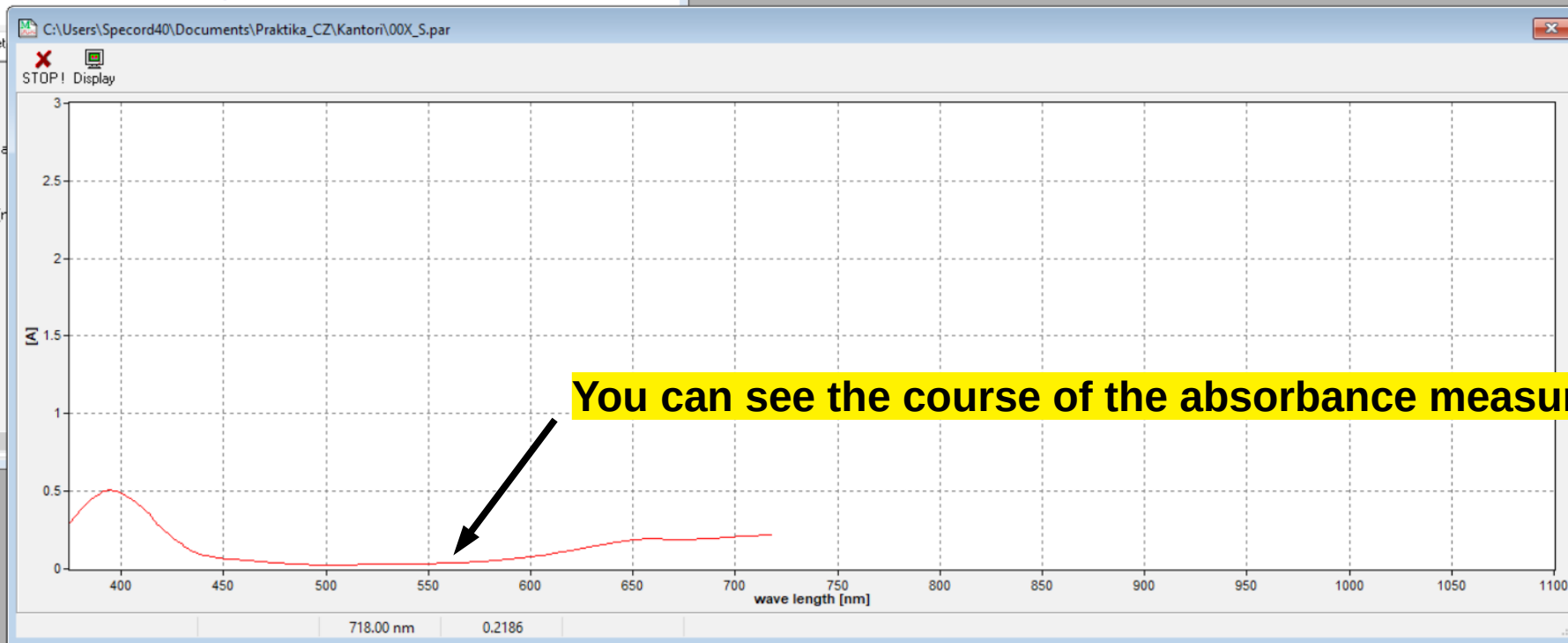
Serial measurement

File Edit Start! Reference Help Close To document

Spectrums A, B and C

Measurement set

Designation  
Display  
Correction  
Lamp change a  
Meas. mode  
Range [nm]  
Delta lambda [n  
Speed [nm/s]





Serial measurement

File Edit Start Reference Help Close To document

Spectrums A, B and C  
00X

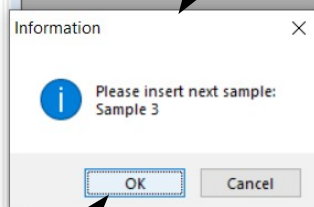
Measurement settings Notes

Designation SPECORD 40 - 2321  
Display Absorbance  
Correction Reference  
Lamp change at 320 nm  
Meas. mode Scan Mode  
Range [nm] 375 - 1100  
Delta lambda [nm] 1  
Speed [nm/s] 50

Table Grafik

		375.0 nm	376.0 nm	377.0 nm	3
1	Sample 1	0.0126	0.0129	0.0130	0
2	Sample 2	0.3013	0.3163	0.3319	0

A request to insert sample C appears.



Insert sample C and press the "OK" button.



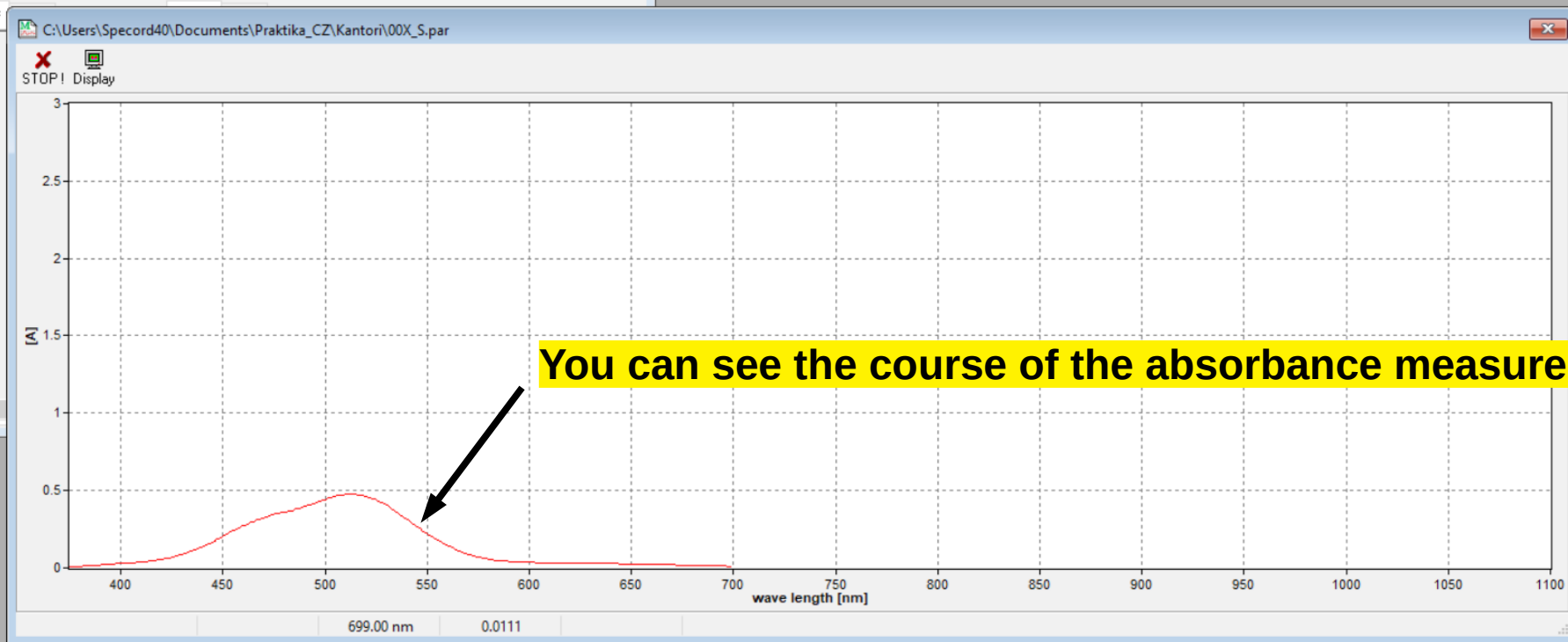
Serial measurement

File Edit Start! Reference Help Close To document

Spectrums A, B and C  
00X

Measurement settings

Designation  
Display  
Correction  
Lamp change at  
Meas. mode  
Range [nm]  
Delta lambda [nm]  
Speed [nm/s]





Serial measurement

File Edit Start! Reference Help Close To document

Spectrums A, B and C  
00X

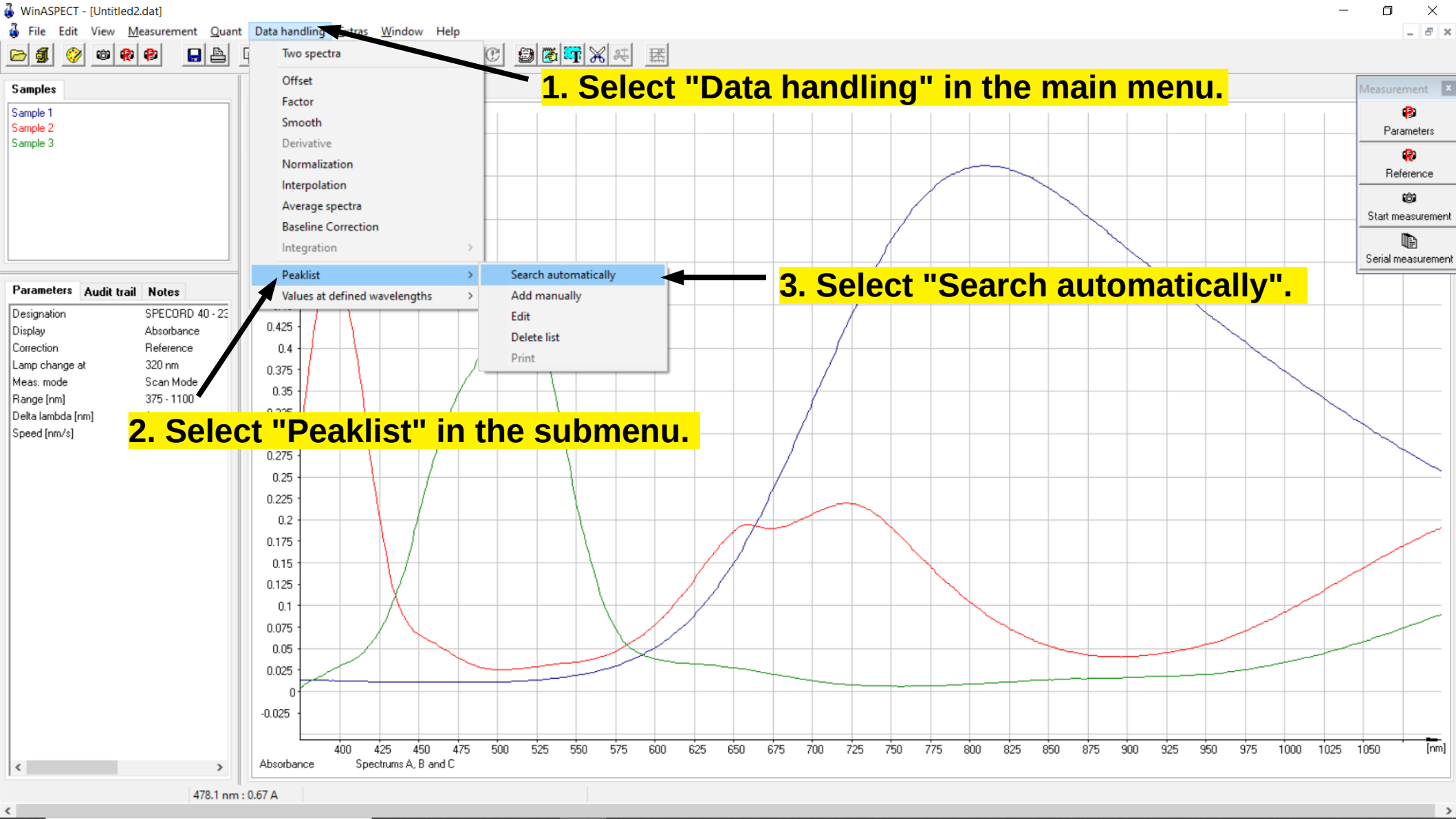
Measurement settings Notes

Designation SPECORD 40 - 2321  
Display Absorbance  
Correction Reference  
Lamp change at 320 nm  
Meas. mode Scan Mode  
Range [nm] 375 - 1100  
Delta lambda [nm] 1  
Speed [nm/s] 50

Table Grafik

		375.0 nm	376.0 nm	377.0 nm	3
1	Sample 1	0.0126	0.0129	0.0130	0
2	Sample 2	0.3013	0.3163	0.3319	0
3	Sample 3	0.0049	0.0062	0.0079	0

Click on the "To document" icon after measuring the spectrums.







## Samples

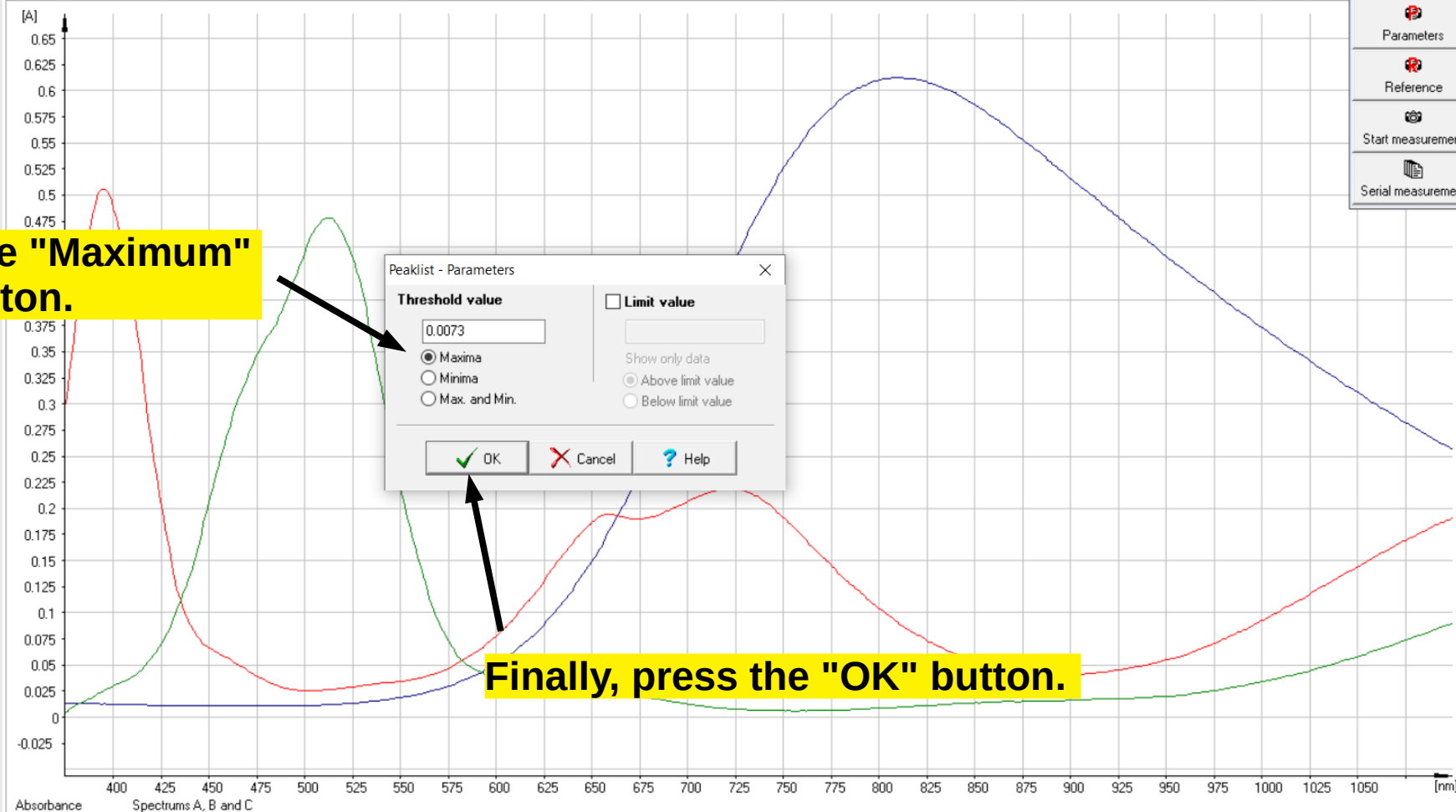
Sample 1  
Sample 2  
Sample 3

## Parameters

Designation  
Display  
Correction  
Lamp change at  
Meas. mode  
Range [nm]  
Delta lambda [nm]  
Speed [nm/s]

320 nm  
Scan Mode  
375 - 1100  
1  
50

## Transmittance Absorbance Values



Select the "Maximum"  
radio button.

Finally, press the "OK" button.



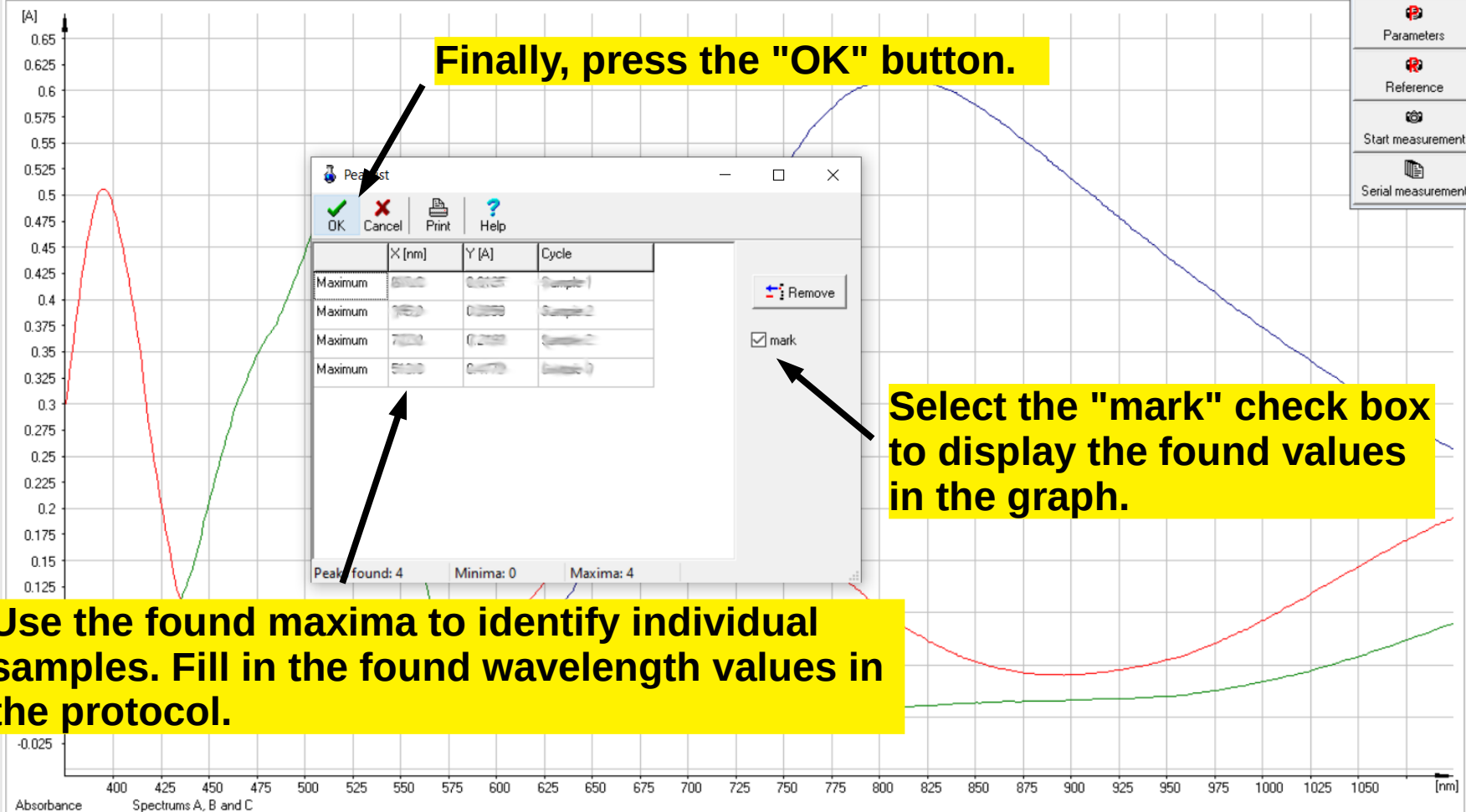
## Samples

Sample 1  
Sample 2  
Sample 3

## Parameters Audit trail Notes

Designation	SPECORD 40 - 20
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Scan Mode
Range [nm]	375 - 1100
Delta lambda [nm]	1
Speed [nm/s]	50

## Transmittance Absorbance Values



## Measurement

Parameters

Reference

Start measurement

Serial measurement



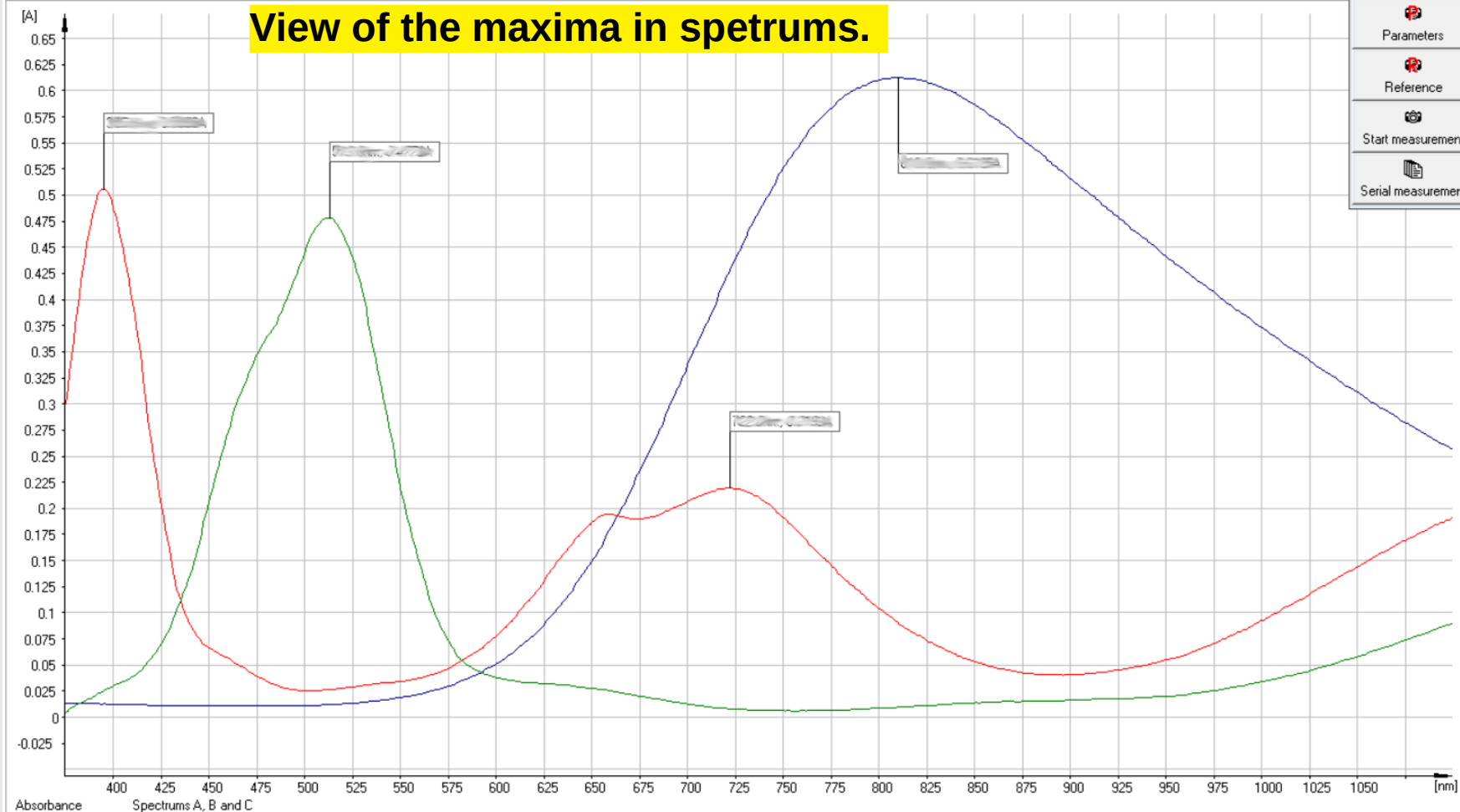
## Samples

Sample 1  
Sample 2  
Sample 3

## Parameters Audit trail Notes

Designation	SPECORD 40 - 20
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Scan Mode
Range [nm]	375 - 1100
Delta lambda [nm]	1
Speed [nm/s]	50

## Transmittance Absorbance Values



## Measurement

Parameters  
Reference  
Start measurement  
Serial measurement



Sample

Sample 1

Sample 2

Sample 3

Param

Designat

Display

Correction

Lamp change at

Meas. mode

Range [nm]

Delta lambda [nm]

Speed [nm/s]

Copy to clipboard

Copy

Strg+C

Paste

Strg+V

Header

Sample properties

Select Curve

Undo Curve Move

New Textbox

Manage textboxes

Section

Cut

3D Plot

Overwrite with original data

1. Select "Edit" in the main menu.

2. Select "Sample properties" in the submenu.

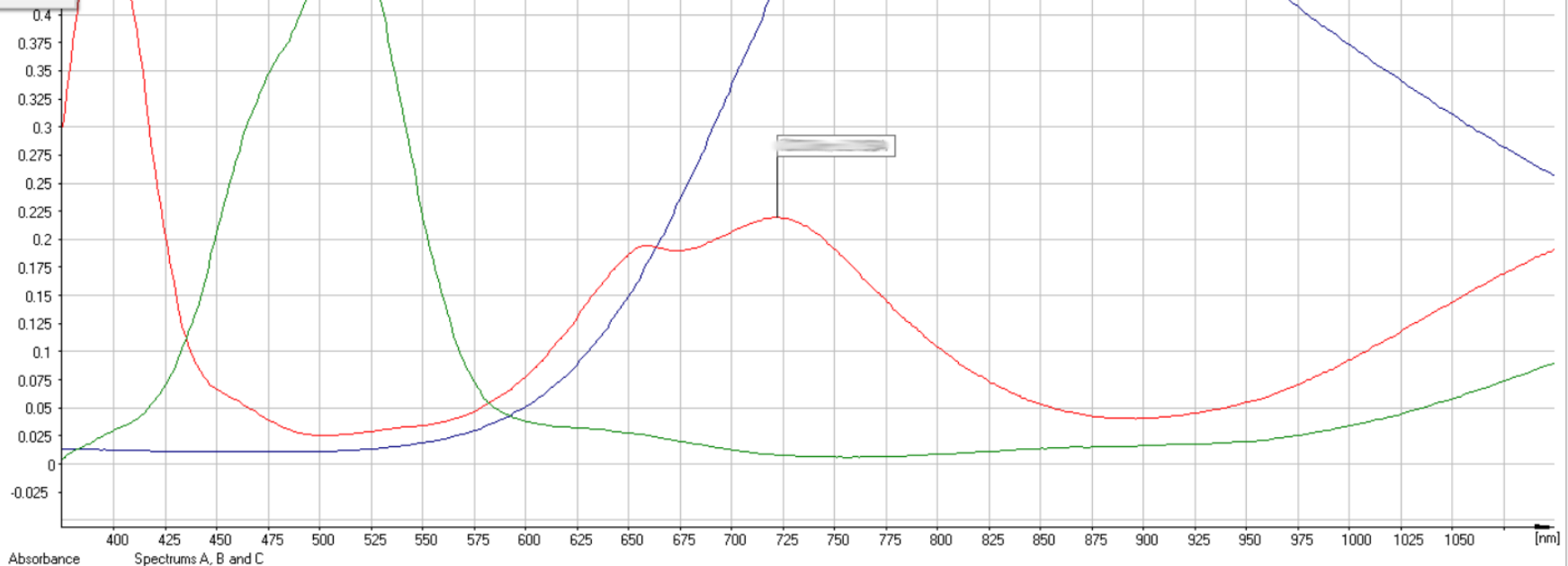
Measurement

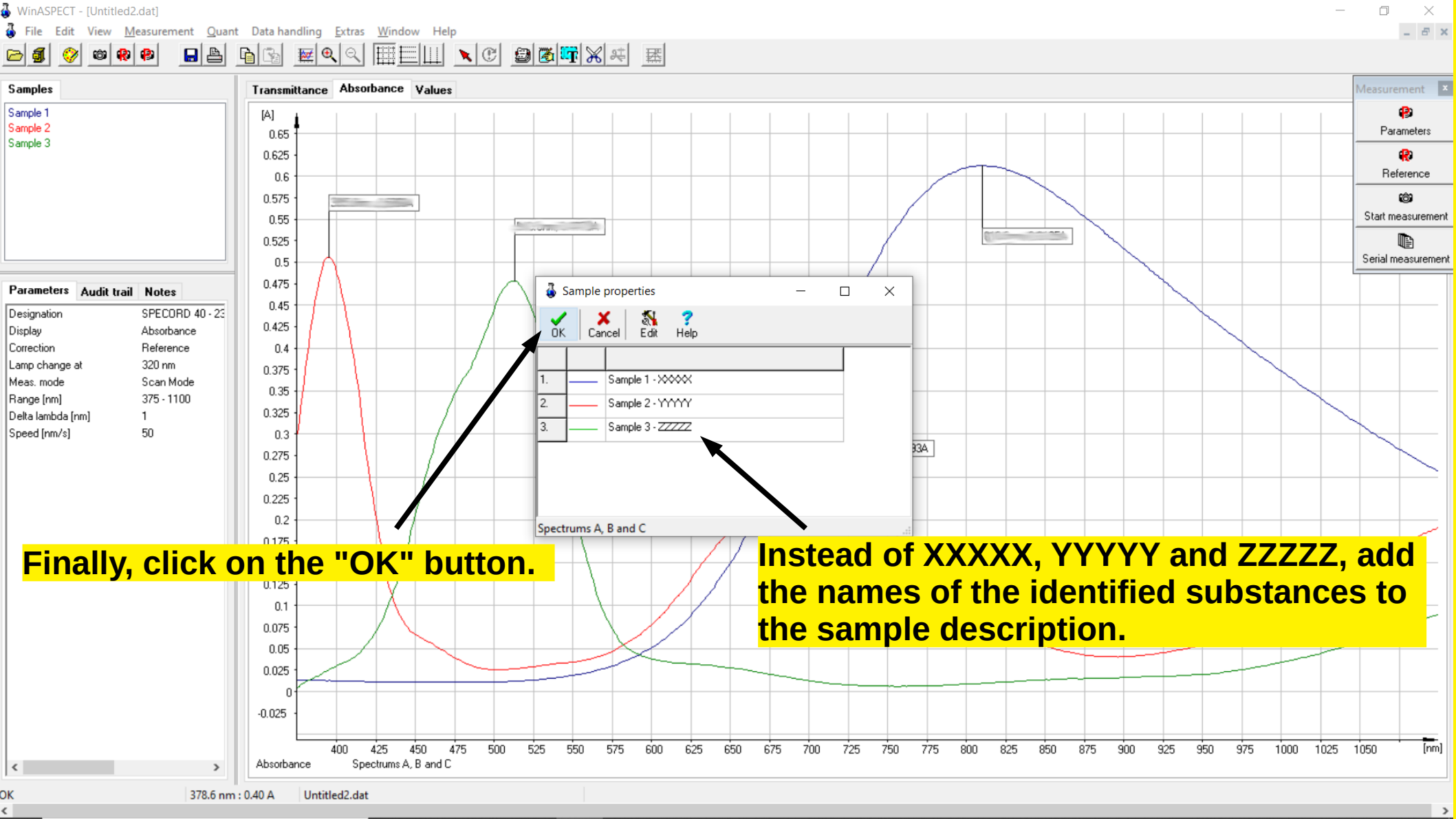
Parameters

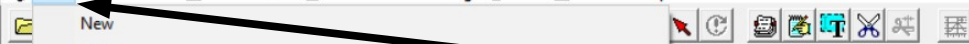
Reference

Start measurement

Serial measurement





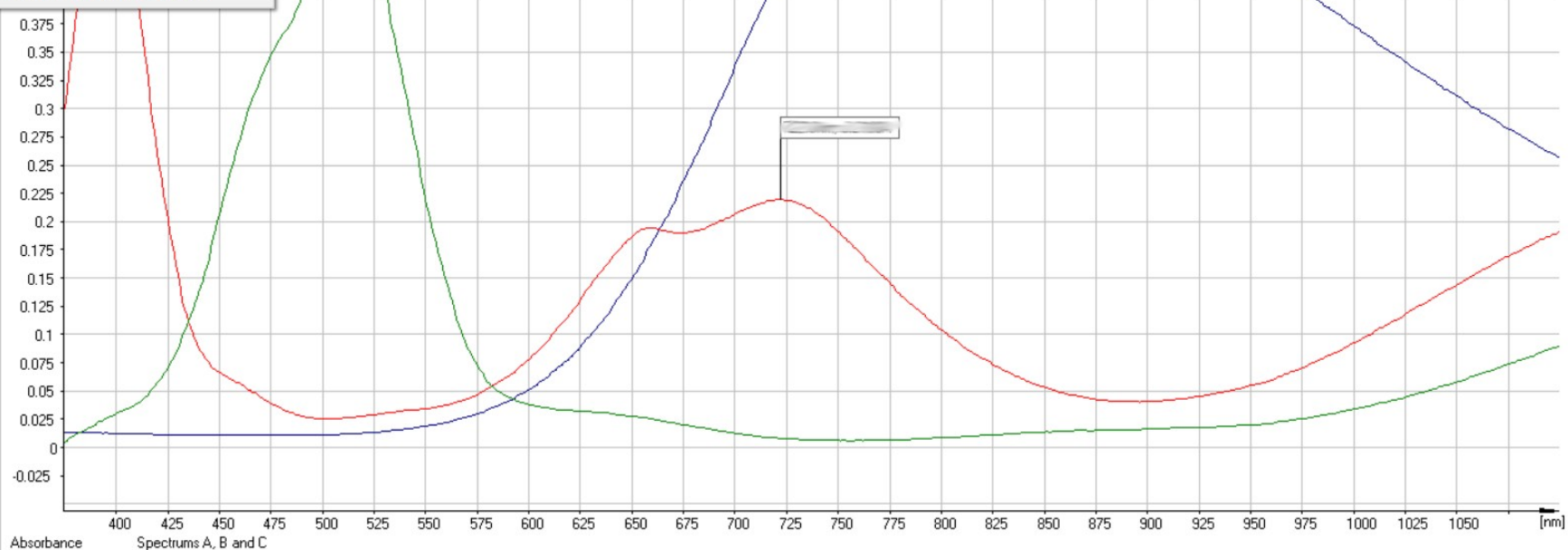


1. Select "File" in the main menu.

2. Select "Save as" in the submenu.

- New
- Open
- Close
- Save
- Save As...
- Export
- Print
- Overlay
- Exit
- 1 C:\Users\Specord40\Documents\Praktikum\_CZ\Kruh11\11A\_S.dat
- 2 C:\Users\Specord40\Documents\Praktikum\_CZ\Kruh08\8F\_S.dat
- 3 C:\Users\Specord40\Documents\Praktikum\_CZ\Kruh08\8E\_S.dat
- 4 C:\Users\Specord40\Documents\Praktikum\_CZ\Kruh05\5B\_S.dat
- 5 C:\Users\Specord40\Documents\Praktikum\_CZ\Kruh05\XO\_6EC1.dat

Lamp change at 320 nm  
Meas. mode Scan Mode  
Range [nm] 375 - 1100  
Delta lambda [nm] 1  
Speed [nm/s] 50



Measurement

- Parameters
- Reference
- Start measurement
- Serial measurement



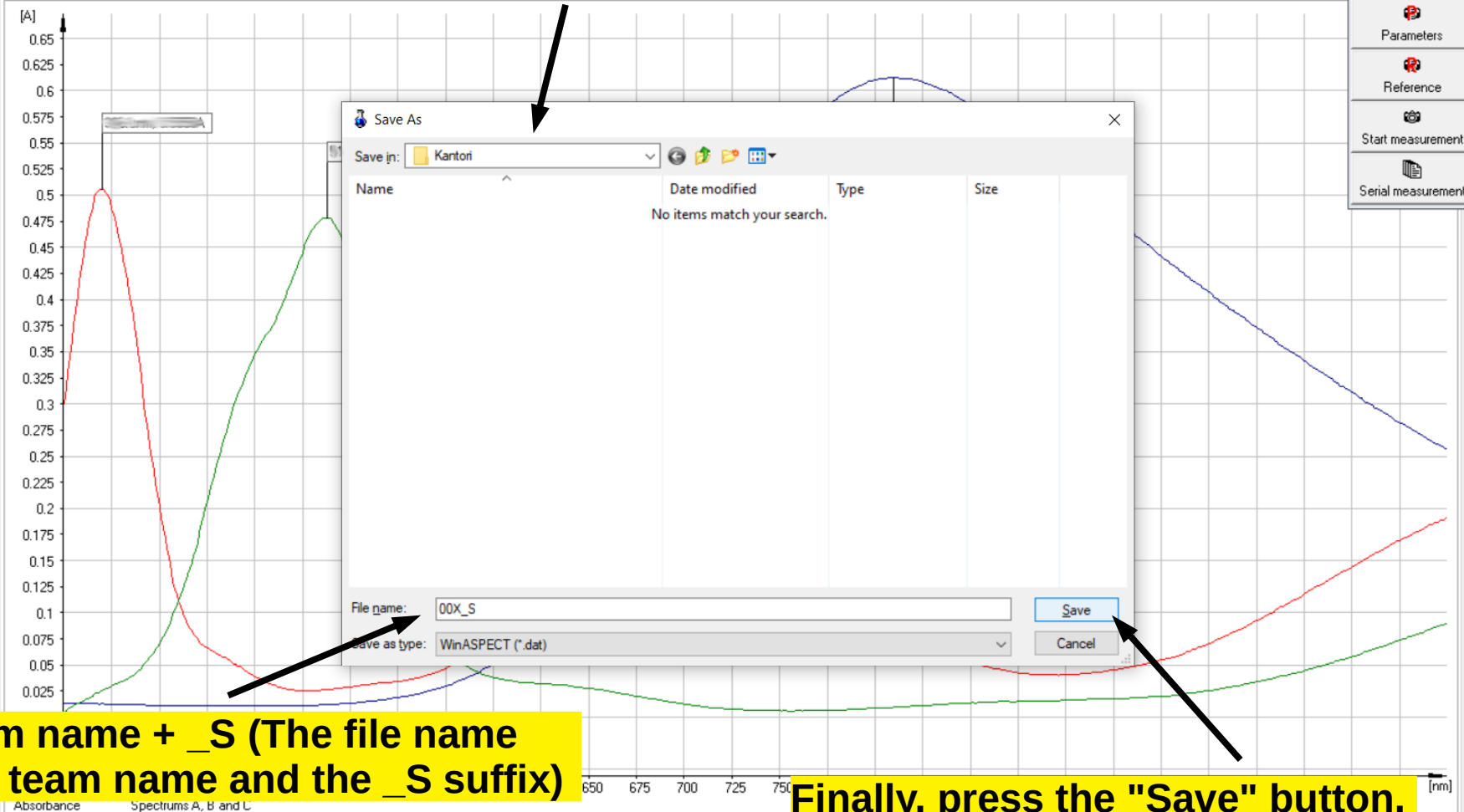
## Samples

Sample 1 - XXXXX  
Sample 2 - YYYYY  
Sample 3 - ZZZZZ

## Parameters Audit trail Notes

Designation	SPECORD 40 - 20
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Scan Mode
Range [nm]	375 - 1100
Delta lambda [nm]	1
Speed [nm/s]	50

## Transmittance Absorbance



Parameters

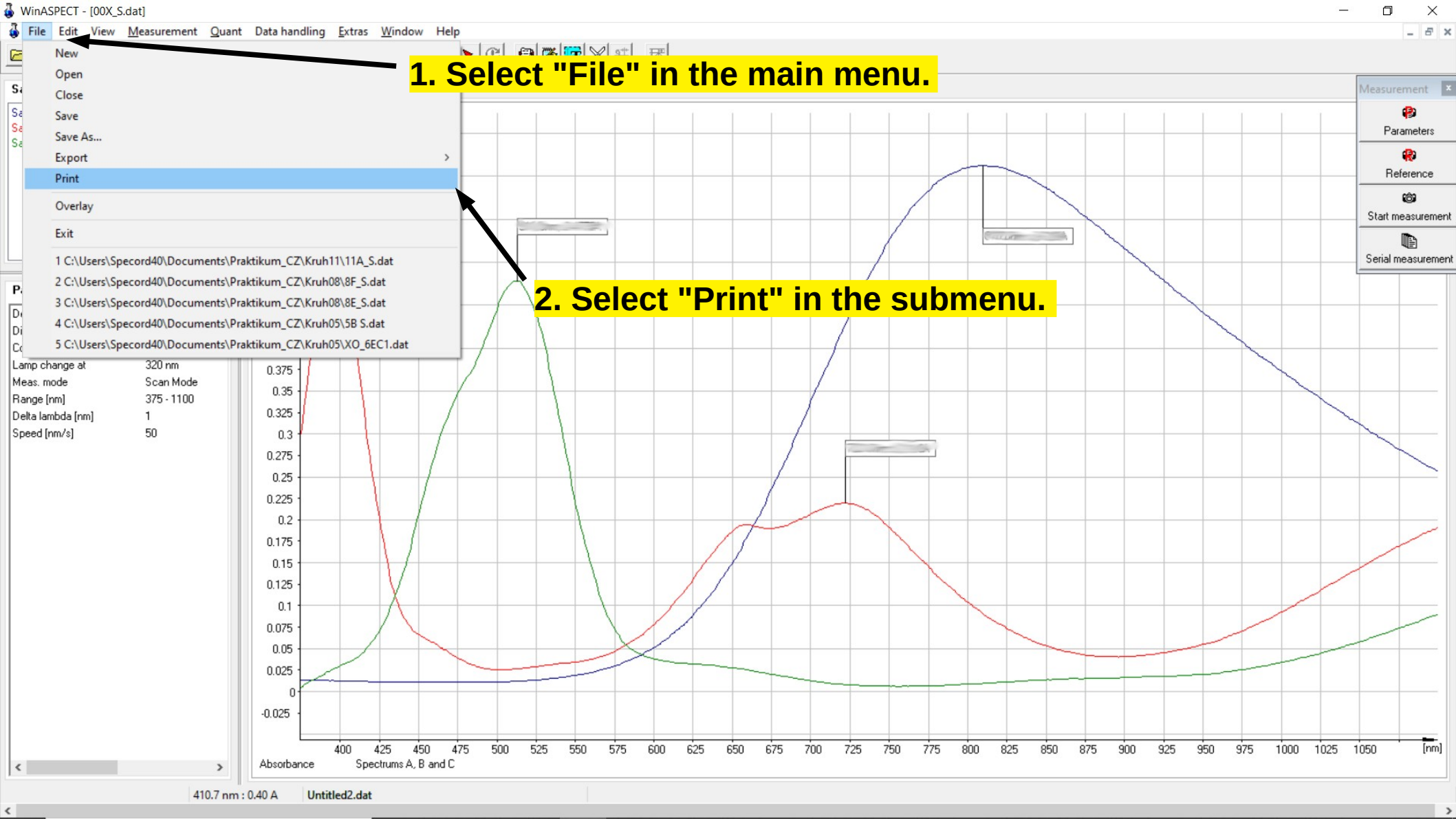
Reference

Start measurement

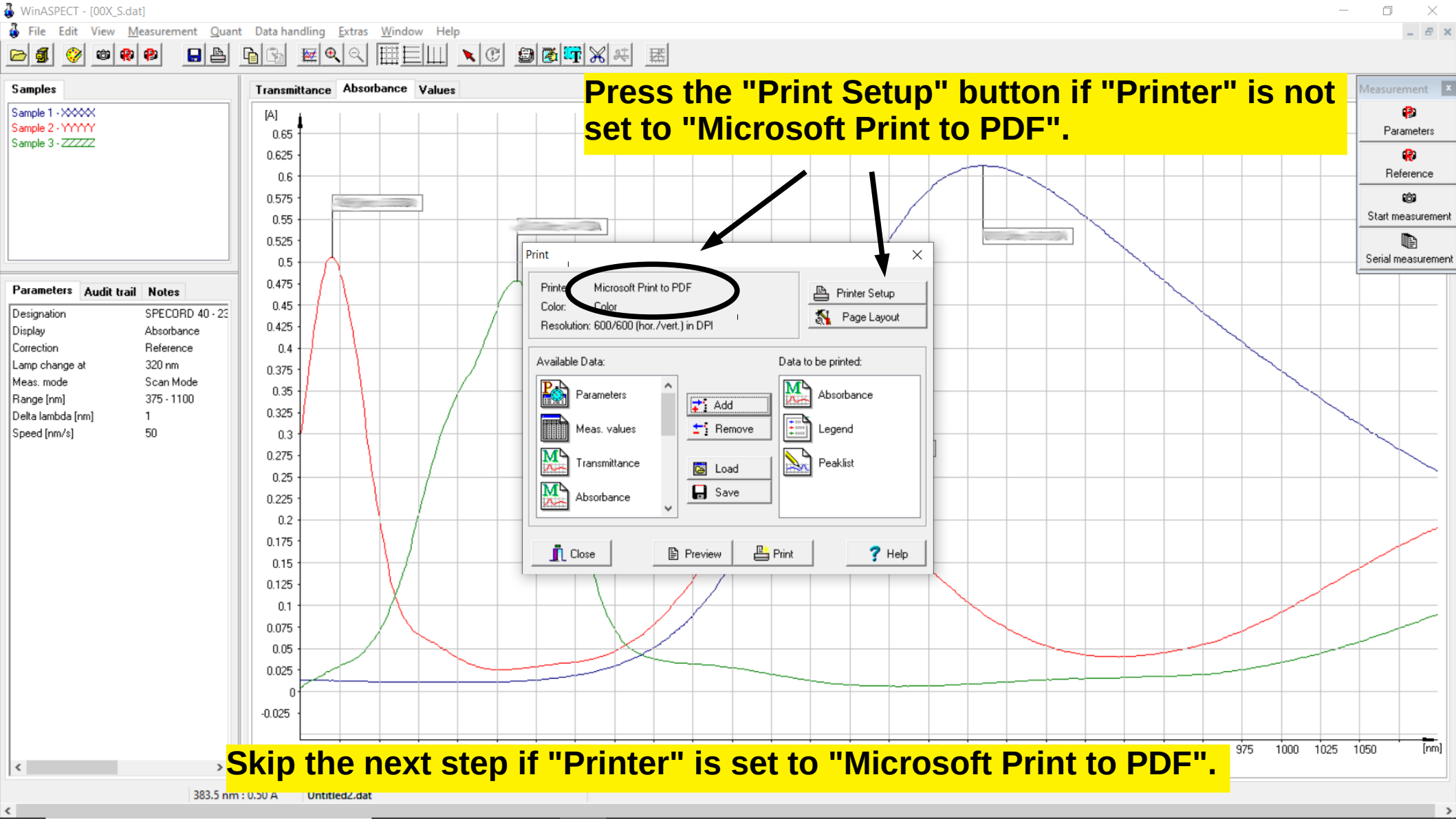
Serial measurement

**File name: Team name + \_S (The file name consists of the team name and the \_S suffix)**

**Finally, press the "Save" button.**







Sample 1 - XXXXX

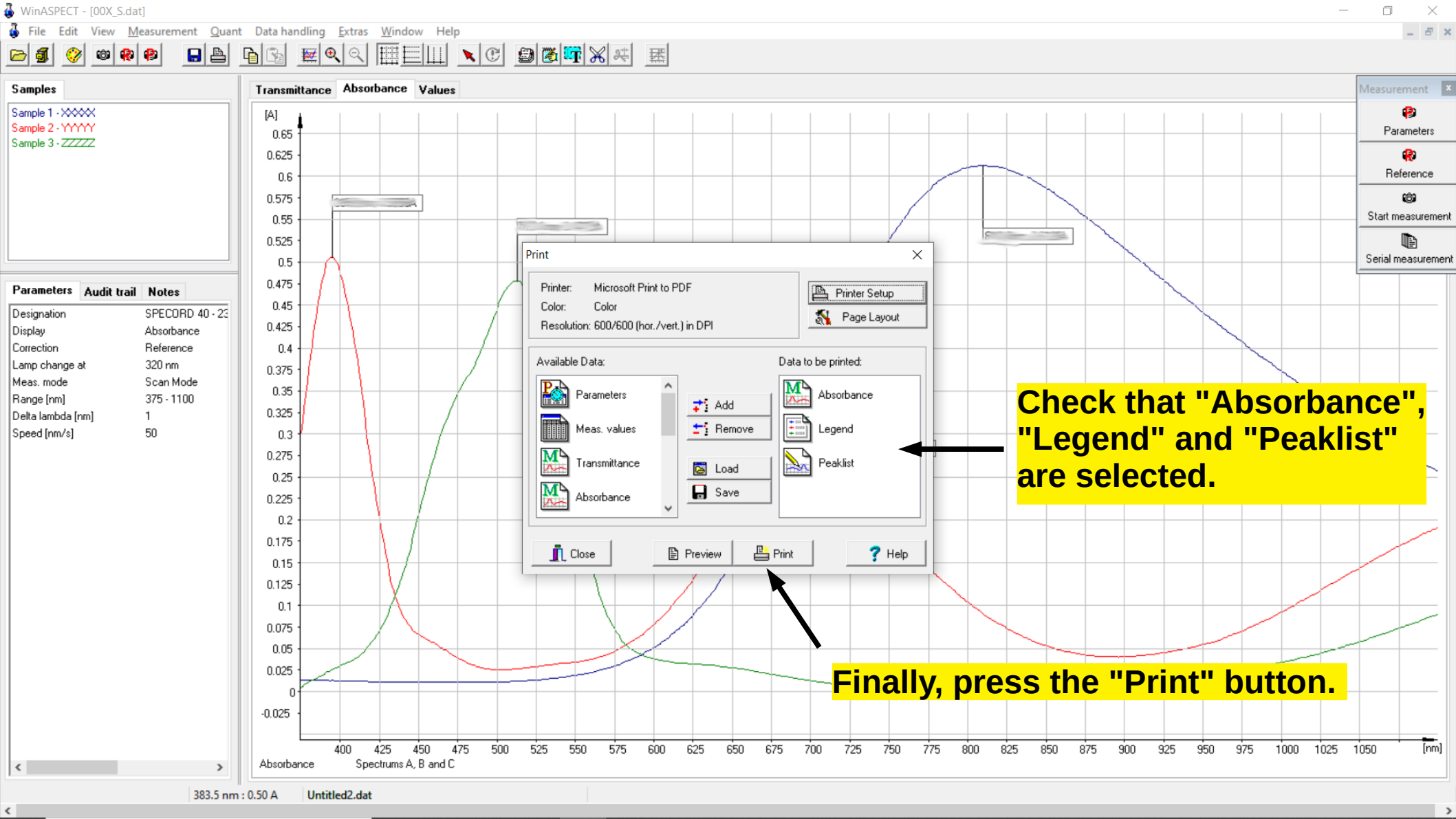
Designation	SPECORD 40 - 23
Display	Absorbance
Correction	Reference
Lamp change at	320 nm
Meas. mode	Scan Mode
Range [nm]	375 - 1100
Delta lambda [nm]	1
Speed [nm/s]	50

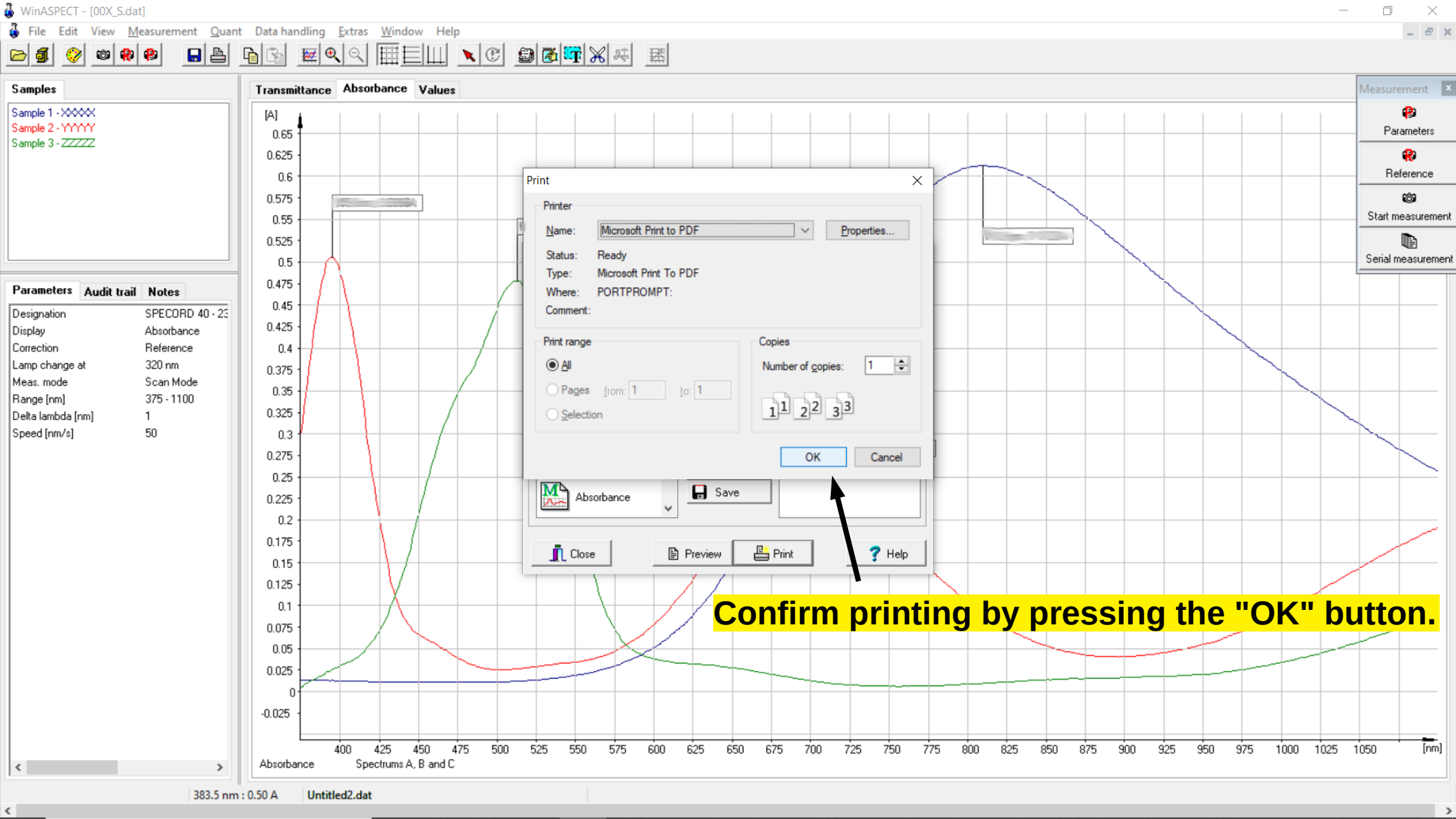
**Select "Microsoft Print to PDF" from the drop-down menu.**

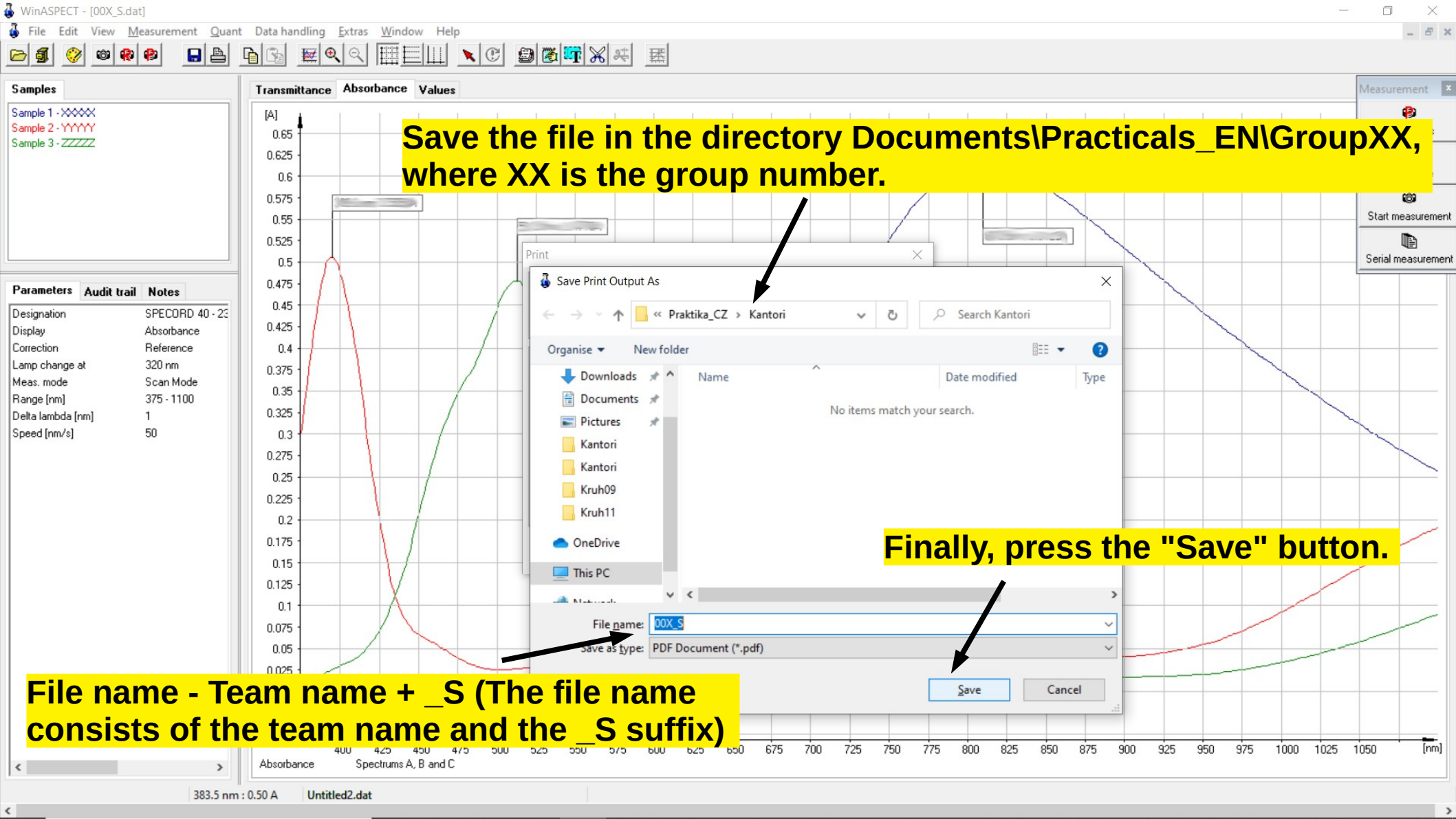
**Finally, press the "OK" button.**

**Select "Microsoft Print to PDF" from the drop-down menu.**

**Finally, press the "OK" button.**



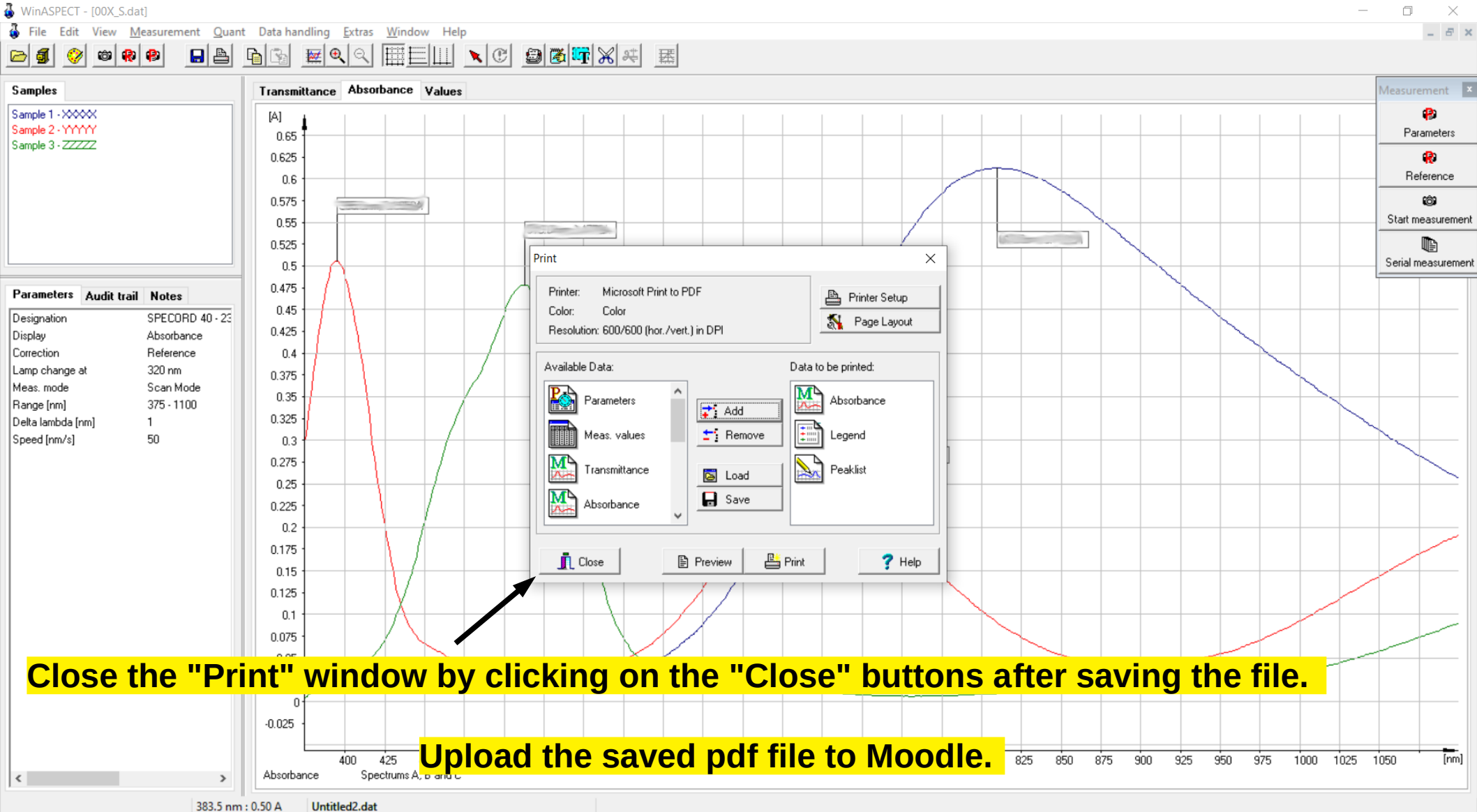




Save the file in the directory Documents\Practicals\_EN\GroupXX, where XX is the group number.

Finally, press the "Save" button.

File name - Team name + \_S (The file name consists of the team name and the \_S suffix)



**The end**